IN THE CLAIMS:

1. (Currently amended) A field emission device for use as a backlight in a liquid crystal television comprising:

a plurality of conductive anodes, each anode having a light-emitting layer;

a plurality of electron emitters, the emitters being separated from the plurality of anodes by a spacer, forming a gap, each of the plurality of emitters comprising:

a conductive electrode; and

a plurality of fibrous clusters, each of the plurality of fibrous clusters being formed *in situ* by a chemical vapor deposition process, each of the plurality of fibrous clusters comprising a plurality of nanofibers grown from a catalytic particulate cluster adhered to the conductive electrode by an adhesion layer, the adhesion layer being formed during processing of a catalyst precursor, wherein the composition of the catalyst precursor comprises a catalyst compound, a solvent and a plurality of non-catalytic particles, the composition being selected such that the plurality of non-catalytic particles aggregate into clusters and support particulates of the catalyst compound helping to adhere the particulates to the conductive electrode in the form of catalytic particulate clusters after deposition and processing of the catalyst precursor such that at least a portion of the plurality of fibrous clusters have a hemispheroidal shape; and

the plurality of conductive anodes and ~~the plurality of cathodes~~ the conductive electrode ~~are~~ is operatively connected to an electronic circuit such that the electronic circuit is capable of controlling the emission of electrons between the plurality of electron emitters and the plurality of anodes.

2. (Original) The field emission device of claim 1, wherein the light-emitting layer comprises a mixture of phosphors.

3. (Currently Amended) The field emission device of claim 1, further comprising a reflective film adhered to the light-emitting layer between the anode and ~~the cathode~~ the conductive electrode.

4. (Original) The field emission device of claim 3, wherein the reflective film is of aluminum.

5. (Original) The field emission device of claim 1, wherein the chemical vapor deposition process and the catalyst compound are selected such that the nanofibers are carbon nanofibers.

6. (Original) The field emission device of claim 5, wherein at least a portion of the catalyst compound of the catalyst precursor is dissolved by the solvent such that evaporation of the solvent is capable of causing the solution to precipitate catalyst particulates on the clusters of non-catalytic particles, the amount of catalyst compound, the number and density of non-catalytic particles and the precipitation process controlling the range of sizes of the catalyst particulates that form the catalytic particulate clusters, and the nanofibers having a range of outer cylindrical diameters, the range of outer cylindrical diameters being determined by the chemical vapor deposition process and the range of sizes of the catalyst particulates.

7. (Original) The field emission device of claim 5, wherein the range of outer cylindrical diameters of the carbon nanofibers is no greater than 200 nanometers.

8. (Original) The field emission device of claim 7, wherein the range of outer cylindrical diameters of the carbon nanofibers is at least 50 nanometers.

9. (Original) The field emission device of claim 1, wherein the hemispheroidal shape is one of an oblate hemispheroid and a prolate hemispheroid.

10. (Original) The field emission device of claim 9, wherein the hemispheroidal shape is an oblate hemispheroid.

11. (Original) The field emission device of claim 5, wherein at least a portion of the carbon nanofibers are comprised of carbon nanotubes.

12. (Original) The field emission device of claim 11, wherein the carbon nanotubes are multi-walled carbon nanotubes.

13. (Original) The field emission device of claim 12, wherein the outer cylindrical diameter of the multi-walled carbon nanotubes is in a range from 50 nanometers to 200 nanometers.

14. (Original) The field emission device of claim 1, wherein the length of the plurality of carbon nanofibers is selected such that the hemispheroidal shape is of entangled nanofibers.

15. (Original) The field emission device of claim 1, wherein each of the plurality of fibrous clusters having hemispheroidal shape is isolated from neighboring fibrous clusters having hemispheroidal shape.

16. (Original) The field emission device of claim 5, wherein the adhesion layer is formed of one of an intermetallic, a carbide, a nitride and combinations thereof.

17. (Original) The field emission device of claim 5, wherein the conductive electrode is comprised of aluminum or an aluminum alloy.

18. (Original) The field emission device of claim 5, wherein the fibrous clusters have hemispheroidal shapes with a mean major axis dimension and the nanofibers have a mean outer cylindrical diameter, and the mean major axis dimension is no greater than 1000 times the mean outer cylindrical diameter.

19. (Original) The field emission device of claim 5, wherein each of the hemispheroidal shapes of the fibrous clusters have a major axis dimension and the nanofibers have a mean outer cylindrical diameter, and the major axis dimension of each of the fibrous clusters is in a range from 50 to 100 times the mean outer cylindrical diameter.

20. (Original) The field emission device of claim 1, wherein the non-catalytic particles are of an organic material.

21. (Original) The field emission device of claim 20, wherein the organic material is a starch.

22. (Original) The field emission device of claim 21, wherein the starch is a mung starch.

23. (Original) The field emission device of claim 1, wherein the non-catalytic particles have a mean maximum lineal dimension of at least 5 micrometers.

24. (Original) The field emission device of claim 23, wherein the non-catalytic particles have a mean maximum lineal dimension of no greater than 20 micrometers.

25. (Original) The field emission device of claim 1, wherein the pattern is one of evenly dispersed fibrous clusters.

26. (Original) The field emission device of claim 25, wherein the fibrous clusters are uniformly sized.

27. (Original) The field emission device of claim 1, wherein the light-emitting layer comprises a mixture of phosphors such that the light-emitting layer emits light of a predetermined color.

28. (Original) The field emission device of claim 1, wherein the electronic circuit scrolls the anodes such that each of the plurality of emitters emits electrons for a duty cycle of no greater than 20 percent.

29. (Original) The field emission device of claim 1, wherein the electronic circuit scrolls the anodes such that each of the plurality of emitters emits electrons for a duty cycle of no greater than 10 percent.

30. (Original) The field emission device of claim 1, wherein the electronic circuit includes a triode structure such that the electronic circuit is capable of both scrolling the plurality of anodes and varying the intensity of each of the plurality of anodes.

31. (Original) The field emission device of claim 1, wherein the threshold field strength of the field emission device is no greater than 3.5 volts.

32. (Original) The field emission device of claim 1, wherein the threshold field strength of the field emission device is no greater than 2 volts.

33. (Original) The field emission device of claim 1, wherein the threshold field strength of the field emission device is in a range from at least 1 volt to no greater than 3.5 volts.

34. (Original) The field emission device of claim 1, wherein the maximum current density of the field emission device exceeds 900 microamps per square centimeter.

35. (Original) The field emission device of claim 1, wherein the maximum current density of the field emission device exceeds 2.7 milliamps per square centimeter.

36. (Original) A process for fabricating a field emission device for use as a backlight in a liquid crystal television, comprising:

forming a cathode structure on a surface of a first substrate such that the electrode adheres to the surface of the first substrate;

preparing a catalyst precursor comprised of a catalyst compound, a binder, a solvent and a plurality of non-catalytic particles such that the catalyst compound forms particulates on the non-catalytic particles;

depositing the catalyst precursor on at least a portion of the cathode structure;

drying the catalyst precursor;

heating the catalyst precursor in an gaseous atmosphere such that the particulates of the catalyst compound are oxidized;

reducing the oxidized particulates of the catalyst compound activating the catalyst particulates;

growing nanofibers on the catalyst clusters, such that the shape of the nanofibers forms hemispheroidal fibrous clusters and the fibrous clusters are adhered to the cathode structure by an adhesion layer formed during at least one of the steps of drying, heating, reducing and growing;

depositing an anode structure on the surface of a transparent substrate;

depositing a light-emitting layer on the anode structure;

forming a spacer from a dielectric material;

forming a gap by sandwiching the spacer between the anode structure and the cathode structure;

sealing the gap between the transparent substrate and the first substrate such that the gap is capable of being evacuated;

evacuating the gap;

connecting the anode structure and the cathode structure in an electronic circuit such that the cathode is capable of emitting electrons across the gap, illuminating the light-emitting layer, wherein the electronic circuit is capable of scrolling the light-emitting layer.

37. (Original) The process of claim 36, further comprising a step of depositing a film of aluminum on the light-emitting layer.

38. (Original) The process of claim 36, wherein the step of growing nanofibers grows nanofibers from the catalyst clusters, such that the nanofibers form entangled hemispheroidal fibrous clusters.

39. (Original) The process of claim 38, wherein the step of growing nanofibers forms carbon nanofibers.

40. (Original) The process of claim 39, further comprising a step of converting the carbon nanofibers to silicon carbide prior to the step of forming a gap.

41. (Original) The process of claim 36, further comprising the step of forming an aluminum film upon the light-emitting layer prior to the step of forming a gap.

42. (Original) The process of claim 36, wherein the step of forming a cathode structure further comprises the steps of sputtering a layer of aluminum or aluminum alloy and patterning the layer of aluminum or aluminum alloy by depositing a layer of photoresist, developing the layer of photoresist in a pattern, removing the undeveloped layer of the photoresist, etching the aluminum or aluminum alloy in the area of removed photoresist and exposing a pattern of aluminum or aluminum alloy by removing the remaining photoresist.

43. (Original) The process of claim 39, wherein the catalyst compound is a mixture of an iron nitrate and a nickel nitrate.

44. (Original) The process of claim 36, wherein the step of growing nanotubes grows nanotubes having an outer mean cylindrical diameter in a range from about 50 nanometers to about 200 nanometers.

45. (Original) The process of claim 38, wherein the step of growing nanotubes forms isolated fibrous clusters.

46. (Original) The process of claim 41, wherein the step of growing nanotubes forms uniformly sized and evenly dispersed fibrous clusters, whereby the light-emitting layer appears to emit light having a uniform intensity to the human eye, when the light-emitting layer is illuminated in an operating device.

47. (Original) The process of claim 36, wherein the step of depositing the catalyst precursor includes a step of printing.

48. (Original) The process of claim 36, wherein the step of preparing a catalyst precursor further comprises the step of selecting non-catalytic particles consisting of selecting from one of a starch, a polymer, a metal, a ceramic and combinations of these, such that an adhesion layer forms between the catalyst particulate clusters and the electrode during the steps of heating and reducing.

49. (Original) The process of claim 48, wherein the step of selecting non-catalytic particles consists of selecting a starch.

50. (Original) The process of claim 48, wherein the step of selecting non-catalytic particles includes selecting an organic binder such that the organic binder coats the non-catalytic particles helping to agglomerate the particulates of the catalytic compound on the non-catalytic particles.

51. (Original) The process of claim 36, wherein the step of heating comprises raising the temperature of the catalyst precursor to a temperature in a range from 350°C to 550°C in a gaseous feedstock selected from one of air, oxygen and carbon dioxide.

52. (Original) The process of claim 36, wherein the step of growing nanofibers comprises catalytic chemical vapor deposition of carbon at a temperature of about 550°C in a gaseous feedstock and the step of growing nanofibers immediately follows the step of reducing.

53. (Original) The process of claim 36, wherein the step of growing nanofibers comprises catalytic chemical vapor deposition of carbon using a gaseous feedstock of acetylene, hydrogen and argon.

54. (Original) The process of claim 53, wherein the combined volume percent of acetylene plus hydrogen is greater than the volume percent of argon and the volume percent of hydrogen is greater than the volume percent of acetylene.

55. (Original) The process of claim 54, wherein the volume percent of hydrogen is about the same as the volume percent of argon.

56. (Original) The process of claim 55, wherein the volume percent of acetylene is about 10 volume percent of the gaseous feedstock.

57. (Original) The process of claim 48, wherein the step of selecting non-catalytic particles includes limiting the size of the non-catalytic particles to particles having a mean maximum lineal dimension in a range from 5 micrometers to 30 micrometers.

58. (Original) The process of claim 57, wherein the size of the particles is in a range from 5 micrometers to 10 micrometers.

59. (Original) The process of claim 57, wherein the standard deviation of the mean maximum lineal dimension is less than 3 μm.

60. (Currently Amended) ~~A~~ The field emission device of claim 1, further comprising a plurality of conductive electrodes aligned in rows, ~~for use as a backlight in a liquid crystal television, comprising a plurality of anodes aligned in rows, each anode having a light-emitting layer and each anode being separated from an opposing cathode by a spacer, each cathode having an electron-emitting layer comprised of nanofibers being capable of forming fibrous clusters, the plurality of anodes and~~ wherein the plurality of ~~cathodes~~ conductive electrodes is ~~being~~ operatively connected by an electronic circuit such that emission of electrons from the ~~electron-emitting layer~~ plurality of conductive electrodes is scrolled and the plurality of anodes are aligned such that ~~causing~~ light ~~to be~~ emitted from the light-emitting layer of at least a portion of at least one of the rows of the plurality of anodes is scrolled.

61. (Currently Amended) The field emission device of claim 60, wherein the electronic circuit includes a triode structure for each ~~cathode~~ of the plurality of conductive electrodes, such that the intensity of the light emitted by the light-emitting layer of each of the plurality of anodes is capable of being independently controlled.

62. (Original) The field emission device of claim 60, wherein the light is scrolled such that successive rows of the plurality of anodes emit light.

63. (Original) The field emission device of claim 62, wherein the peak luminance of the backlight is at least 1000 cd/m^2.

64. (Original) The field emission device of claim 62, wherein the peak luminance of the backlight is at least 3000 cd/m^2.

65. (Original) The field emission device of claim 60, wherein the liquid crystal television has a diagonal screen measurement of at least 30 inches.